WASHINGTON
SCIENCE TRENDS

HIGHLIGHTS

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* ADP PITFALLS

The Navy, under Defense Department orders to survey its automatic data processing programs, has discovered a number of "pitfalls" and "mistakes" which may be of value to other organizations facing similar problems.

Survey of a dozen Navy ADP installations which have been operational for a year or more shows:

ø Increased Costs -- In five out of six installations in which the direct costs of data processing were expected to be reduced, they were increased. Cost increases also occurred in the remaining installations, although in these cases no reductions were anticipated.

Among the reasons:

✓ Computer running time substantially greater than anticipated. Many original estimates were in error due to inexperience or "undue optimism" but there was also a general inclination to overlook the need for continuous program testing time to implement new or revised programs resulting from changes in regulations or procedures.

✓ New work has been loaded on electric accounting machines (EAM) originally scheduled for release when ADP was installed. Also, some ADP applications have been expanded beyond their initial concept.

✓ Personnel reductions could not always be carried out in the functional areas affected by the computer system. This is attributed to the inability to achieve all of the system improvements originally hoped for.

ø Few Management Improvements -- "In general," the Navy states, "significant management improvements have not yet materialized to the extent anticipated." While gains and improvements have been effected in some areas, strides toward this goal have been disappointing.

Among the reasons:

✓ Complexity of the task of implementing a computer system has been seriously underestimated. Principal causes are its impact upon the more traditional way of doing business, coupled with the need for attention to a myriad of detail.

✓ Resistance or disinterest on the part of customers of the new system has been a problem. Some of this has been caused by lack of top management support, or lack of understanding.

✓ Inflexibility of computer systems has caused difficulty. Known and needed improvements are not implemented rapidly where extensive reprogramming and testing effort are necessary.

Navy management officials point out that some of these difficulties were anticipated and that plans for future installations are going ahead.

SPECIAL NOTICE: In response to many requests, Washington SCIENCE TRENDS this week begins publication of a valuable Research and Development Directory, outlining fields of interest and points of contact for organizations interested in Government R&D contracts in a wide variety of fields. Directory supplement pages will appear with each issue in the coming weeks and can be filed separately for handy reference.

* FAA PATENT POLICY

The Federal Aviation Agency, Washington 25, D. C. has formalized its so-called "fair share" patent policy under which the Government must be reimbursed for a large share of benefits from patents resulting from FAA R&D contracts.

The new order states: "In negotiating contracts under which the Government pays a part or all of the costs of research or development, it is the policy of the Federal Aviation Agency to retain, for the benefit of the United States, rights to data and patent rights, in reasonable proportion to the contributions of the Agency and the contractor; and to recover the FAA's contribution toward such research and development through royalties to the Government upon commercial exploitation of the products developed thereby."

FAA says this order formalizes policies which have been in effect for some time. About $50 million of major R&D contracts already provide for retention by the Government of rights to such data and patents; about $12 million in contracts already provide for repayment of FAA's development costs through royalties to the Government when products are sold commercially. Existing contracts with this royalty provision permit recovery of up to 7½% of commercial sales and sales to other governments, and 33⅓% of royalties derived from licensing.

* RADIOCHEMISTRY DATA

The first 13 monographs in a planned series of 56 on the radiochemistry of the elements are now available for purchase. Designed for the "working scientist", each monograph is planned as an up-to-date compilation of the latest available radiochemical information and procedures.

The following may be ordered from OTS, U. S. Department of Commerce, Washington 25, D. C.:

NAS-NS-3001 Cadmium, 75 cents.
NAS-NS-3002 Arsenic, 50 cents.
NAS-NS-3003 Francium, 50 cents.
NAS-NS-3004 Thorium, 75 cents.
NAS-NS-3005 Fluorine, Chlorine, Bromine, and Iodine, 50 cents.
NAS-NS-3006 Americium and Curium, 75 cents.
NAS-NS-3007 Chromium, 50 cents.
NAS-NS-3008 Rhodium, 50 cents.
NAS-NS-3009 Molybdenum, 50 cents.
NAS-NS-3010 Barium, Calcium, and Strontium, $1.25.
NAS-NS-3011 Zirconium and Hafnium, 50 cents.
NAS-NS-3012 Astatine, 50 cents.
NAS-NS-3014 Indium, 50 cents.

* JAPANESE ELECTRONIC OUTPUT

Expansion of Japanese electronics output will be much greater than expected over the 1960-1964 time period. Estimates published in May this year predicted a 32 percent increase over 1959; the "revised" figures forecast an 82 percent increase. (A detailed breakdown by product is available from Information Office, Business and Defense Services Administration, Washington 25, D. C. Ask for BD-60-191, November 4, 1960.)

* INERTIAL POWER SUPPLIES

The Sandia Corporation working under Atomic Energy Commission sponsorship, has developed a system for supplying inertial power for use in ballistic missile re-entry vehicles, and possibly other applications.

Inertial Generator -- the system is based on an inertial generator which, in its simplest form, consists of a movable mass mounted within a fixed structure in the vehicle. It is mechanically linked to an electric generator -- so that motion of the mass results in operation of the generator.

Features of the system:

✓ Safety -- An accidental release of energy during storage or handling is said to be impossible with the inertial generator since no energy is available until the rocket motor has functioned and the missile is in its trajectory. In addition, even deliberate operation of such a device -- intended to function at high speeds -- is extremely difficult unless it is removed from the vehicle.

✓ Choice of energy conversion means -- Energy conversion can be accomplished in a number of ways, depending upon the desired characteristics of the electrical output, and upon the acceleration - versus - time behavior of the vehicle. In typical ballistic missile re-entry curves, where accelerations are in the range of 10 to 100 g's for at least several seconds and the desired result is to charge a capacitor, an ordinary rotary generator with appropriate gearing appears most likely to be used. In a system where accelerations go to the order of thousands of g's, some sort of mechanical "capacitance" such as a spring is needed.

Working Models -- Sandia began in 1958 the design and construction of feasibility models of an inertial generator that would charge a 9-microfad capacitor, through a transformer-rectifier, to 1700 volts in 2 seconds at 30 g's. Four models were built and tested on a centrifuge. Two were subsequently flight tested in a missile, operating on the re-entry deceleration. The units performed satisfactorily on all tests, and with improvements overall efficiencies of the order of 40 to 50 percent are expected.

Other Applications -- Sandia sees many possible applications using various forms of inertial generators. A model of another type designed to operate at 2,00 g's has been built in which a movable mass winds a spring which subsequently drives a rotary generator.

Where large amounts of energy are required, existing masses in the vehicle may be used to drive the generator. An attractive possibility is said to be the use of a heavy liquid as a driving mass. This could be passed through a long, thin tube, thus sweeping out far less volume than an equivalent solid mass moving the same distance.

The conclusion reported to the AEC:

"With future development of more efficient, more sophisticated designs, the inertial generator is expected to find a variety of applications. It provides a unique means for the storage of energy in a moving vehicle for some later, specialized use."

(R&D reported by R. J. Martin, Sandia Corporation, Albuquerque, New Mexico. Technical Report SCR-219 available through AEC channels or at 50 cents from OTS, U. S. Department of Commerce, Washington 25, D. C.)

TECHNICAL TRENDS

□ The U. S. Army Transportation Research Command, Ft. Eustis, Va. is interested in hearing from firms which have the capabilities of adapting a 40 foot paraglider to a modified Army L-19 aircraft. The paraglider is described by the Army as an aerodynamically stable and controllable lifting device with a foldable parachute-like structure. √√√ The Command is also interested in inflatable ground effect machine R&D. √√√ The Atomic Energy Commission is turning over to private interests its activities as a distribution center for engineering drawings, specifications, photographs, and bills of materials. Details are available from the information Office, AEC, Washington 25, D. C. Ask for Announcement IN-149. √√√ The Commerce Department estimates that the U. S. is spending at the per capita rate of about $150 a year on chemicals and chemical products, and this outlay is increasing 7 percent annually.

□ Sealed bids are being invited on Government-owned calcined alumina, used for production of aluminum, refractory bricks, spark plugs, insulators and other products. The total quantity is 2,600 short tons but offers for quantities down to 20 short tons will be considered. Details are available from Director, Project Administration Division, Defense Materials Service, General Services Administration, Washington 25, D. C. √√√ The General Electric Company, Schenectady, N. Y. has received an Army Signal Corps contract for development of a reliable long-life planar triode tube for a communications satellite. √√√ Sylvania Semiconductor Division, Woburn, Mass. has received a $99,818 contract for experimental micro-miniature transistors.

□ Flight tests of the new 1,500 A-2 model of the Polaris missile will begin this month at Cape Canaveral. The A-2 incorporates a longer first stage motor and a lighter and more powerful second stage motor than the "operational" A-1. Development work has been authorized on an A-3, 2,500 nautical mile version, expected to be available in 1965. √√√ The first issue of a "Food Irradiation Quarterly Newsletter" can be obtained free of charge from European Information Center for Food Irradiation, Post Office Box No. 6, Gif-sur-Yvette, Seine-et-Oise, France. √√√ The Navy has awarded a $26.8 million contract to the Applied Physics Laboratory of the Johns Hopkins University, Silver Spring, Md. for continued development of the highly successful Bumblebee series of missiles. The program covers the Terrier, Tartar, Talos and Typhon missiles, among others.

□ The U. S. Bureau of Mines, Office of the Assistant Director - Helium, Washington 25, D. C. has available a new four page leaflet on submission of proposals for participation in the program for extraction of helium from natural gas. √√√ Fairchild Astrionics, Wyandanch, L. I., N. Y. is developing two long-range radars under a $600,000 Navy contract. The units will be used for tracking satellites or space capsules from instrumentation ships based at the Pacific Missile Range. √√√ An excellent summary of current and future space propulsion and energy programs, as outlined by Maj. Gen. Don R. Ostrander, is available in Release No. 60-285 from Information Office, NASA, Washington 25, D. C. √√√ The Atomic Energy Commission has established a Neutron Cross Section Evaluation Center to provide a centralized source of information for reactor engineers, designers and physicists. Inquiries should be directed to the Center at Building T-130, Brookhaven National Laboratory, Upton, L. I., N. Y.

□ Congressional ire at indecision and delay has resulted in an NASA-AEC agreement to seek an industrial contractor to provide engineering support and to conduct R&D on the nuclear rocket engine (Project Rover) program. A previous request for proposals on a six-month preliminary design study has been cancelled. √√√ Similar reasons lie behind the Administration's decision to release some of the appropriated funds for the Air Force B-70 bomber program.

ROYALTY-FREE PATENT CHECKLIST

Here is a new listing of selected Government-owned patents now available for use by industry on a royalty-free basis. Subscribers desiring further information may write Service Department, Washington SCIENCE TRENDS, 1120 National Press Building, Washington 4, D. C.

You will be furnished with the patent number, and information on where to obtain a copy of the patent, and where to apply for licensing.

- ☐ MASS SPECTROMETER: This patent relates to a mass spectrometer employing two adjustable magnetic fields, a thin foil in the path of the beam, and an electrostatic field.

- ☐ MAKING YTTRIUM METAL: This patent covers a process of making yttrium metal by reducing yttrium fluoride with calcium plus magnesium.

- ☐ CENTRIFUGE MOUNTING: This protective housing for a gas centrifuge features a slidable connection between flanges and framework for absorbing rotational energy in the event a rotor bursts.

- ☐ MAGNETIC GRID: This electronic grid employs magnetic forces for controlling the passage of charged particles and may be particularly useful in gas-filled tubes.

- ☐ HIGH SPEED CENTRIFUGE: This device, for the separation of gaseous isotopes, consists of a centrifugal pump mounted on the outlet of a centrifuge bowl, and arranged to pump the heavy and light fractions out of the bowl in two separate streams.

- ☐ DIAMOND COLORING PROCESS: This patent covers a process for coloring substantially colorless diamonds to the blue to blue-green range by irradiation with electrons.

- ☐ MINIATURE RADAR ANTENNA: In this miniature radar transmitting and receiving antenna a ground plane supports a pair of adjacent ridges. These have inwardly disposed curved surfaces spaced apart, but facing each other and with edge portions spaced from the ground plane.

- ☐ IMPROVED TRANSFORMER: This patent describes a transformer for joining an unbalanced transmission means to a balanced transmission means. One application is the transmission of an electromagnetic signal from a coaxial cable to a balanced dipole antenna.

- ☐ AUTOMATIC PARTICLE COUNTER: This patent relates to an automatic counter of alpha particle tracks as recorded by a sensitive emulsion of photographic plate.

- ☐ VACUUM TRAP: This patent covers an improved adsorption trap for use in vacuum systems. It features a number of torsionally deformed fins which permit virtually all of the condensible impurities from the evacuating gas to be removed from the vacuum system.

PUBLICATION CHECKLIST

- ☐ EXPLOSIVE WORKING OF METALS, an excellent study prepared at the U. S. Naval Ordnance Test Station, China Lake, Calif. of the problems and opportunities in the use of explosives as a high energy rate source in the working of metals. Covers such operations as forming, shaping, forging, extruding, welding, compacting and others. 48 Pages. (Available through military channels or at $1.50 from OTS, U. S. Department of Commerce. Ask for NAVORD Report No. 7033.)

- ☐ WESTERN SCIENCE, a thought-provoking report by experts of the U. S. and European nations on means of increasing the effectiveness of scientific and industrial research in the West. Includes a number of recommendations for future action. 19 Pages. Free. (Write Foundation Universitaire, 11 rue d'Egmont, Brussels 5, Belgium.)

- ☐ SCIENCE AND TECHNOLOGY HEARINGS, a transcript of testimony, statements and reports presented to a Congressional committee on a wide variety of technical subjects including Federal support of research and development. 101 Pages. Single Copies Free. (Write Committee on Science and Astronautics, New House Office Building, Washington 25, D. C. for House Report No. 2226.)

- ☐ NOISE, a Congressional report on the many problems of acoustics involving the aircraft and missile industries. 51 Pages. Single Copies Free. Also available, complete text of Hearings. 206 Pages. Single Copies Free. (Write Committee on Science and Astronautics, New House Office Building, Washington 25, D. C. for House Report No. 2229.)

- ☐ MILITARY SUPPLY MANAGEMENT, the full text of statements, testimony and exhibits presented to a Congressional committee on the management of the military supply system for a wide variety of products, with the emphasis on electronics. 375 Pages. Single Copies Free. (Write Committee on Government Operations, Subcommittee on Military Operations, U. S. House of Representatives, Washington 25, D. C. for Hearings--Military Supply Management.)

- ☐ ASTRONOMICAL ALMANAC, a booklet issued annually by the Interior Department for the use of its cadastral engineers. Contains tables and charts of the daily position of the sun and hourly changes of the North Star. Semimonthly positions for 28 other stars are also given. 30 Cents. (Write Superintendent of Documents, Government Printing Office, Washington 25, D. C. for "The Ephemeris -- 1961".)

- ☐ INTERNATIONAL ATOMIC POLICIES, a critical review of the International atomic policies and programs of the United States, with a broad outline of developments in the U. S. and abroad. 78 Pages. Single Copies Free. (Write Joint Committee on Atomic Energy, F-88, The Capitol, Washington 25, D. C. for Volume I - Review of International Atomic Policies.)

- ☐ AEC TECHNICAL JOURNALS, information on nuclear science abstracts and technical progress reviews published by the Atomic Energy Commission. 27 Pages. Free. (Write U. S. Atomic Energy Commission, Technical Information Service Extension, P. O. Box 62, Oak Ridge, Tenn.)

- ☐ MILITARY PRODUCTS QUALIFICATION, a Defense Department booklet designed to help industrial suppliers in understanding the purpose and application of the Qualified Products Lists program. Single Copies Free. (Write Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia 20, Pa. for Department of Defense booklet "Product Qualification and Qualified Products Lists".)

RESEARCH AND DEVELOPMENT DIRECTORY

* DEPARTMENT OF THE ARMY

Organizations interested in performing research and development for the Department of the Army have a number of opportunities to present their qualifications.

Standard forms for this purpose are available from:

Office of the Chief, Research and Development
Department of the Army
Washington 25, D. C.
Attn: Technical Liaison Office

Army research activities are divided among seven Technical Services. Each maintains a liaison office in the Washington area. These are:

Corps of Engineers	---	Bldg. T-7, Gravelly Point, Va.
Chemical Corps	---	Bldg. T-7, Gravelly Point, Va.
Ordnance Corps	---	The Pentagon, Washington 25, D. C.
Signal Corps	---	The Pentagon, Washington 25, D. C.
Transportation Corps	---	The Pentagon, Washington 25, D. C.
Quartermaster Corps	---	Bldg. T-B, 2nd & R Streets, S. W., Washington 25, D.C.
Army Medical Service	---	Main Navy Building, 17th and Constitution, N. W., Washington 25, D. C.

Research and Development activities are also carried on at various Army facilities throughout the U. S. These installations may also provide a number of opportunities for R&D contracts and technical procurement.

ø CORPS OF ENGINEERS

✓ WATERWAYS EXPERIMENTAL STATION

P. O. Box 631, Halls Ferry Road
Vicksburg, Mississippi

Interests - Dust Control; Flexible Pavements; Metal and Plastic Landing Mats; Mobile Test Laboratories for Concrete, Asphalt and Soils; Research on Soil-Vehicle Relationships; Soil Stabilizers; Subsurface Exploration Equipment; Trafficability Maps and Aerial Photographs; and Trafficability on Soils and Snow.

✓ SNOW, ICE AND PERMAFROST RESEARCH ESTABLISHMENT

1215 Washington Avenue
Wilmette, Illinois

Interests - Aerial Photo Interpretation of Snow Regions; Arctic Research Investigations; Avalanche Research Investigations; Bearing Strength of Ice Sheets; Excavation of Frozen Ground; Glaciology Research Investigations; Snow Cover Maps; and Snow, Ice and Frozen Ground Research.

✓ DISTRICT ENGINEER, PHILADELPHIA DISTRICT

2635 Abbotsfort Avenue
Philadelphia, Pennsylvania

Interests - Prefabricated Breakwaters and Prefabricated Piers

Ø CORPS OF ENGINEERS (continued)

✓ ENGINEER RESEARCH AND DEVELOPMENT LABORATORIES

Fort Belvoir, Virginia

Interests - Air Compressors; High and Low Pressure Bridging and Stream Crossing Equipment; Buildings and Utilities; Camouflage and Deception Supplies and Equipment; Construction and Maintenance Equipment; Crevasse Detectors; Electrical Equipment; Engines, Gasoline and Diesel, Fire Fighting Equipment, Forestry Equipment, and Fortifications and Obstacles; Industrial Cases and Equipment; Infrared; Liquid Fuels Distribution; Mapping; Materials for Construction and Equipment; Mine Clearance; Mine Detectors; Mine Planting Equipment; Nuclear Power and Heating Plants; Pneumatic Tools; Processing and Packaging; Pumps; Research on Demolition Techniques and Equipment; Snow and Ice Removal Equipment; Sprayers, Insect; Trailers and Semi-Trailers; Turbines; Gas and Water Purification Equipment.

Ø ORDNANCE CORPS

✓ ABERDEEN PROVING GROUND

Aberdeen, Maryland

Interests - Ballistic Research; Development of Protective Coatings; Engineering Tests; Equipment and/or professional operations in support of: Human Engineering Evaluation.

✓ DIAMOND ORDNANCE FUZE LABORATORIES

Connecticut Avenue and Van Ness Street, N. W.
Washington 25, D. C.

Interests - VT Fuzes and Electronic Devices for Ordnance Items.

✓ FRANKFORD ARSENAL

Bridge and Tacony Streets
Bridesburg Station
Philadelphia 37, Pennsylvania

Interests - Ammunition for Recoilless Rifles; Ammunition up to and including 30 mm, except metallic belt links, cal. .30, .50, .60, and 30 mm; Cartridge Actuated Devices; Cartridge Cases; Drill Ammunition for AA Guns and Recoilless Rifles; Fire Control Equipment including Spotting Rifles; MT Fuzes for Artillery Projectiles; Projectiles; and Recoilless Rifles.

✓ ORDNANCE TANK-AUTOMOTIVE COMMAND

1501 Beard Street
Detroit 9, Michigan

Interests - Combat and Transport Vehicles; Gun Mounts for Automotive Vehicles; Hydropneumatic Recoil Mechanism for Cannon Peculiar to Automotive Vehicles; and Supporting Research in Land Locomotion.

✓ PICATINNY ARSENAL

Dover, New Jersey

Interests - Complete rounds of: Artillery and mortar ammunition; Atomic artillery and demolition type munitions (less nuclear components); Mines; Grenades; Bombs and Pyrotechnics; Demolition charges; Drill ammunition - JATO's; Warheads (non-atomic, for guided missiles and rockets), and Explosives.